SUPREME COURT, U. S.

Supreme Court, U.S.
FILED
APR 6 1971
E. ROBERT SEAVER, CLERK

IN THE

# Supreme Court of the United States

OCTOBER TERM, 1970

No. 1547

GENERAL RADIO COMPANY, *Petitioner-Plaintiff*

v.

KEPCO, INC., *Respondent-Defendant*

## PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE SECOND CIRCUIT

ROBERT H. RINES
DAVID RINES
*Attorneys for the Petitioner*

*Of Counsel:*

RINES AND RINES
No. Ten Post Office Square
Boston, Massachusetts 02109

JULIUS FOSTER
101 Park Avenue
New York City, New York

NELSON H. SHAPIRO
Shapiro and Shapiro
640 Washington Building
15th and New York Avenue, N.W.
Washington, D.C. 20005

PAUL J. FOLEY
Belen and Foley
840 Pennsylvania Building
425 13th Street, N.W.
Washington, D.C. 20004

RICHARD S. PHILLIPS
Hofgren, Wegner, Allen,
Stellman & McCord
20 North Wacker Drive
Chicago, Illinois 60606

PRESS OF BYRON S. ADAMS PRINTING, INC., WASHINGTON, D. C.

## INDEX


| | Page |
|---|---|
| Opinions Below | 2 |
| Jurisdiction | 2 |
| Questions Presented | 3, 4 |
| Constitutional Provision, Statutes and Rule Involved | 4 |
| Statement of the Case | 4 |
| Discussion of Questions I and II | 7 |
| Discussion of Question III | 11 |
| Reasons for Granting the Writ | 13 |
| Conclusion | 15 |
| Appendix A | |
| Opinion of the Court of Appeals for the Second Circuit | 1a |
| Orders Denying Rehearing | 6a |
| Appendix B | |
| Findings of Fact, Conclusions of Law and Order for Judgment of United States District Court, Eastern District of New York | 7a |
| Memorandum of Dooling, J. | 37a |
| Memorandum and Order | 47a |
| Appendix C | |
| Amendment 5, U.S. Constitution | 48a |
| 35 U.S.C. 281, Patent Act of 1952 | 48a |
| 35 U.S.C. 103, Patent Act of 1952 | 48a |
| Rule 52(a) FRCP | 49a |

## CITATIONS


CASES: Page

Anderson's-Black Rock v. Pavement Salvage, 396 U.S. 57 (1969) ..... 8

Continental Can Co. v. Crown Cork & Seal, Inc., 281 F. Supp. 474 (E.D. Pa., 1967) rev'd. 415 F. 2d 601 (3d Cir. 1969) cert. den. 397 U.S. 914 ..... 11

General Foods Corp. v. Perk Foods Co., 283 F. Supp. 100 (N.D. Ill. 1968) rev'd. 419 F. 2d 944 (7th Cir. 1969) cert. den. 397 U.S. 1038 ..... 11

Graham v. John Deere Co., 383 U.S. 1 (1966) ....3, 4, 7, 8, 9, 10, 13

Graver Tank v. Linde Air Products, 336 U.S. 271 (1949) ..... 10

Great Atlantic and Pacific Tea Co. v. Supermarket Equipment Corp., 340 U.S. 147 (1950) ..4, 6, 11, 12, 13

Sciaky Bros., Inc. v. Deep Welding, Inc., 417 F. 2d 1227 (7th Cir. 1969) cert. den. 397 U.S. 1037 ..... 11

Stevenson v. Diebold, Inc., 210 F. Supp. 917 (N.D. Cal., 1962), rev'd 422 F. 2d 1228 (9th Cir. 1970 cert. den. — U.S. —„ 27 L. Ed. 2d 64 ..... 11

United States v. U.S. Gypsum, 333 U.S. 364 (1947) .... 7

Amendment 5, U.S. Constitution ..... 4, 7

STATUTES AND RULES:

28 U.S.C. 1254(1) ..... 2

28 U.S.C. 1338 ..... 2

35 U.S.C. 103 .....4, 8, 11, 13

35 U.S.C. 281 .....3, 4, 6

Rule 41(b) FRAP ..... 2

Rule 52(a) FRCP .....3, 4, 7, 8, 9, 10, 13

IN THE

# Supreme Court of the United States

OCTOBER TERM, 1970

---

No.

---

GENERAL RADIO COMPANY, *Petitioner-Plaintiff*

v.

KEPCO, INC., *Respondent-Defendant*

---

**PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE SECOND CIRCUIT**

---

*To the Honorable Chief Justice and Associate Justices of the Supreme Court of the United States:*

Your petitioner, General Radio Company, respectfully prays that a Writ of Certiorari issue to review the judgment of the United States Court of Appeals for the Second Circuit, entered in the above-entitled action on November 27, 1970, reversing the decision of the United States District Court for the Eastern District of New York.

A certified transcript of the record in the above case including the printed Joint Appendix and the proceedings in the said Court of Appeals, is furnished herewith. References to the printed Joint Appendix will be designated by "J.A." and the page number.

## OPINIONS BELOW

The opinion of the Court of Appeals for the Second Circuit is reported at 435 F. 2d 135 (1970) and appears as Appendix A (A. 1a-5a) to this petition and in the certified transcript.

The opinion of the District Court for the Eastern District of New York, does not appear to have been reported. It is reproduced in the record at J.A. 1033a-1102a and appears as Appendix B to this petition (A. 7a-48a), including Findings of Fact, Conclusions of Law and Order for Judgment, Memorandum by Dooling, J., and Memorandum and Order.

## JURISDICTION

The jurisdiction of this Court is invoked under 28 U.S.C., § 1254(1). The federal jurisdiction of the District Court was based on 28 U.S.C. 1338. The judgment of the Court of Appeals for the Second Circuit was dated and entered on November 27, 1970. As appears from the said record, a timely petition for reconsideration or review and rehearing *en banc* was denied on January 6, 1971. By orders dated Jan. 26, 1971 and Feb. 24, 1971 the Court of Appeals granted a stay of the issuance of the mandate pending application to the Supreme Court for a writ of certiorari, pursuant to Rule 41(b) FRAP, the stay to be effective for a period of ninety days from Jan. 6, 1971.

## QUESTIONS PRESENTED

### I.

Where the District Court made over 75 detailed findings of fact* following a full "civil action" trial (35 USC 281) with live witnesses, experts and demonstrations, may a Court of Appeals circumvent the requirements and standards of Rule 52 (a) FRCP as interpreted by the Supreme Court, and subvert all the judicial procedure precedents and Constitutional rights inherent in such statute-authorized trial proceedings, by the device of *not* setting aside a single one of such 75 findings as "clearly erroneous" or against the weight of the evidence or on any other basis, but just completely *ignoring* all such findings, without even mention or comment, as if the "civil action" trial had never existed?

### II.

Where the trial court made specific findings of fact following in detail the analysis required by the Supreme Court in *Graham* v. *Deere* ** and reached the conclusion that the patent in suit (perhaps today's dominant electronic instrument power supply patent) is valid as unobvious, and, indeed, as representing "electronic elegance", was the Court of Appeals correct in reaching a contrary conclusion without either setting aside the trial court's findings as clearly erroneous [Rule 52(a)] or making any such detailed analysis itself whatsoever?

---

* Over 75 paragraphs of specific fact finding in 35 numbered findings.

** 383 U.S. 1 (1966).

## III.

Where a Court of Appeals concedes that a patent involves a "*new* combination" of old elements, may it completely ignore, without comment, the District Court's specific findings under the "unobviousness" requirements of *Graham* v. *Deere* and merely conclude that this is the same type of combination as in *Graham* and thus "improbably" patentable under the "test of invention" of *A & P* v. *Supermarket?**

## CONSTITUTIONAL PROVISION, STATUTES AND RULE INVOLVED

The pertinent Constitutional provision is the Fifth Amendment, and the pertinent statutes and rule involved are 35 U.S.C., 103, 281 and Rule 52(a) of the Federal Rules of Civil Procedure.

These are quoted in Appendix C (A. 48a-49a).

## STATEMENT OF THE CASE

The issues here involved *do not require scientific or technical understanding or detail,* even though this case involves a suit for infringement of a patent (Holtje 2,942,172) covering a significant and now perhaps the most widely used and dominant electronic power supply invention in the instrumentation field.

While the largest manufacturer of this type of equipment has been licensed (J.A. 278a), the licensing (or litigation) with regard to the numerous other users of this invention has been deferred pending the outcome of this litigation (J.A. 606a-609a).

---

* 340 U.S. 147 (1950).

This is one of those extremely rare cases where the District Court lauded the significance and novelty of an invention, describing it as

> "characterized by electronic elegance . . . and not simply by ingenuity (A. 26a)" . . . a deft and imaginative union of elements that was not suggested by or inherent in their nature and previous uses . . ." (A. 46a).

This, indeed, is one of those path-making advances for which the Constitution and the patent laws (and all of us, pro- or anti-patents, generally) intend patents to be granted. *All* of the elements and tests of invention and unobviousness ever laid down by the courts of this land, from the earliest of times to the present, were here specifically found by the District Court: (1) years of unsuccessful efforts of skilled workers to solve the problem (A. 46a, 24a), though all the elements of the new combination lay at hand (A. 26a, 46a); (2) an approach contrary to the teachings and expectation of the prior art and technology that had, rather, proceeded on "divergent paths" and "had treated as alternative or disjunctive approaches that Holtje brought into cooperative action" (A. 46a, 26a); (3) a combination that produced *more* than the "sum" of the parts (A. 40a); a combination in which the union of elements produced a "novel and surprising mode of operation, that produced a new advantageous result" (A. 26a); and a combination in which the elements thereof cooperatively operated in a manner "not suggested by or inherent in their nature and previous uses" (A. 46a).

The District Court rendered its 69-page opinion with over 75 paragraphs of detailed and original findings of fact, following an extended trial at which

expert witnesses for both sides testified and were cross-examined, and at which actual apparatus representing both the prior art and the invention in suit were operated in the courtroom, with the judge coming off the bench and watching actual measurements being taken and plotted to explain operation. That District Court opinion was carefully written over a period of almost a year following the trial.

It is in this setting, that the Court of Appeals for the Second Circuit—perhaps the most followed and respected court of appeals in the land—has, after a few minutes of oral hearing and but a few days of reading, written a 4½ page opinion that completely ignores all of the District Court's specific findings, that does not even pretend that any of them is unsupported in the record, that merely substitutes conclusory fiats of its own, and that totally deprives your petitioner of all the rights vested in its statutory right to a "civil action" or trial provided for in 35 USC 281:

> "A patentee shall have remedy by civil action for infringement of his patent."

This was done, moreover, on the expressed understanding (A. 5a) that this Supreme Court has ruled that new combinations of old elements simply can't be patentable (citing *A & P* v. *Supermarket*, *supra*) and that "obviousness" under *Graham* v. *Deere*, *supra*, is a mere matter of the feeling of a Court of Appeals irrespective of the facts found by the District Court and supported by the record.

Nay, more. The clear implication of this decision is that the public policy indicated by the Supreme Court (as interpreted by the Court of Appeals) with regard

to combination-of-element patents, warrants abrogating the Federal Rules, including Rule 52(a), and even the right to a civil action or trial and the fruits thereof.

**Discussion of Questions I and II**

Question I may involve a question of first impression as to the propriety and even the constitutionality of the conduct of the Court of Appeals in this case, and involves the general standards and scope of appellate review.

While it has previously been noted in *United States v. U.S. Gypsum*, 333 U.S. 364 (1947), page 395, that

> "judicial review of findings of trial courts does not have the statutory or constitutional limitations on judicial review of findings by administrative agencies or by a jury"

the present case is one where, in effect, *the whole trial and all of the over 75 trial court findings* based on evidence (i.e. the "remedy by civil action" provided by the statute) has been arbitrarily ignored as if it never existed, and without explanation.

It strongly appears that this action, coupled with the failure to follow the requirements of Rule 52(a), has deprived your petitioner of the right to a "civil action" or trial, to the presentation of live witnesses and demonstrations inherent therein, and to the fruits of such trial, even in contravention of the statute and the due process clause of the Fifth Amendment of the Constitution.

If allowed to stand, it will be a dangerous precedent for all appellate review, providing a new way for eva-

sion of the body of law of which Rule 52(a) is a part, and the substantive rights of litigants.

Turning to the patent setting of Question II for an understanding of the specific deprivation of rights in the trial, in the *Graham* decision this Supreme Court explained in detail how to find whether a particular device is or is not obvious; namely, page 17, to make

> "inquiries into the obviousness of the subject matter."

These "inquiries" are as follows:

> Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or non-obviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. As indicia of obviousness or nonobviousness, these inquiries may have relevancy.

In *Anderson's-Black Rock* v. *Pavement Salvage,* 396 U.S. 57 (1969), the Supreme Court, at p. 62

> "admonished that 'strict observance' of those requirements is necessary."

The Court of Appeals here made absolutely no such "inquiries" and heeded no such admonition.

The District Court, on the other hand, did make those very "inquiries" and made very detailed findings of fact based thereon meeting those requirements. Among the findings of fact of the District Court, none of them held to be clearly erroneous, and, therefore, none of

them set aside, and all of them ignored completely by the Court of Appeals, were the following; all authorized by this Supreme Court's *Graham* opinion, *supra*:

Findings determining "the scope and content" of the prior art (A. 14a-20a, 24a, 25a, 38a-40a, 46a);

A finding ascertaining the "differences" between the prior art and the four claims in issue (A. 14a-20a, 24a, 25a, 38a-40a, 46a);

Findings resolving the level of ordinary skill in the pertinent art (A. 24a-26a, 46a, 47a); and

"Against this background", findings determining that the subject-matter of the four claims in issue was not obvious (A. 15a-17a, 20a, 24a-26a, 39a, 40a, 46a).

The District Court also made findings of fact relating to the "secondary considerations" specifically mentioned in the *Graham* opinion; namely

> "commercial success" (A. 25a, 26a, 46a, 47a), "long felt but unsolved needs" (A. 12a-14a, 23a-26a, 46a), "failure of others" (A. 12a-14a, 23a-26a, 46a);

but, as before stated, the Court of Appeals, without finding them to be clearly erroneous, and without setting any of them aside, simply ignored them.

The decision of the Court of Appeals being thus decidedly not in conformity with the statute or Rule 52 (a), it should be reversed for that reason alone.

But the serious precedent represented by this case, that the Supreme Court's required "inquiries" and admonitions apparently do not apply to Courts of Appeals, as distinguished from the trial courts, should be corrected before further confusion results.

More than this, this case represents, as before noted, an interpretation by the Court of Appeals for the Second Circuit of Rule 52(a), as applied in patent cases, which is entirely contrary to the interpretation of this

Supreme Court and of other Courts of Appeals in their current decisions.

Thus, for example, in *Graver Tank* v. *Linde Air Prod.*, 336 U.S. 271-281 (1949), the Supreme Court said, at pages 274 and 275:

> "Rule 52(a) of the Federal Rules of Civil Procedure provides in part: 'Findings of fact shall not be set aside unless clearly erroneous, and due regard shall be given to the opportunity of the trial court to judge of the credibility of the witnesses.' To no type of case is this last clause more appropriately applicable than to the one before us, where the evidence is largely the testimony of experts as to which a trial court may be enlightened by scientific demonstrations."
>
> * * *
>
> "The rule requires that an appellate court make allowance for the advantages possessed by the trial court in appraising the significance of conflicting testimony and reverse only 'clearly erroneous' findings."

The practice of the Court of Appeals for the Second Circuit in just ignoring all of the District Court's findings in this case, with no discussion of underlying evidence, certainly violates the doctrine of the *Graver Tank* case, *supra*. This is, indeed, such a departure from the accepted and usual course of judicial proceedings as to require review by this Supreme Court and a reassertion of the authority of the Federal Rules of Civil Procedure and this Court's decisions.

Certainly this is in conflict, also, with the current procedures under Rule 52(a) followed by other Courts of Appeals, which analyze the evidence and make clear the basis on which they set aside factual findings; and further, in connection with patent cases, make the inquiry into "obviousness" required by the Supreme Court de-

cisions.* This appears also to be a deprival of the statutory right to a "civil action" trial proceeding.

**Discussion of Question III**

This case illustrates that there still is confusion in the courts as to whether the *A & P* "test of invention", implying lack of probability of invention in any new combination of old elements (layed down before the 1952 Patent Act and Section 103 thereof) or the "unobviousness" doctrine of *Graham* v. *Deere* now applies in the case of "new combinations" not found in the prior art; or both.

While conceding that a "new combination" of old elements has, indeed, been produced, the Court of Appeals, citing and quoting the *A & P* case, concluded that such combinations are just not patentable—or otherwise stated, that there is great "improbability of . . . invention".

Altogether apart from whether *Graham* or *A & P* applies under the 1952 Patent Act however, it so happens that the Court of Appeals, in ignoring all of the District Court's findings, overlooked that even the test of *A & P* had been fully met and by specific findings of the District Court.

---

* The impropriety of the approach of the Court of Appeals is apparent from the comparison of the Trial and Appellate Court decisions here with those in other recent cases in which a patent was first held valid by the Trial Court and invalid by the Court of Appeals. *Stevenson* v. *Diebold, Inc.*, 210 F.Supp. 917 (N.D. Cal. 1962), *rev'd.* 422 F.2d 1228 (9th Cir. 1970) cert. den. — U.S. —, 27 L.Ed. 2d 64; *Continental Can Co.* v. *Crown Cork & Seal, Inc.*, 281 F.Supp. 474 (E.D. Pa. 1967) *rev'd.* 415 F.2d 601 (3d Cir. 1969) cert. den. 397 U.S. 914; *Sciaky Bros., Inc.* v. *Deep Welding, Inc.*, 417 F.2d 1227 (7th Cir. 1969) cert. den. 397 U.S. 1037; *General Foods Corp.* v. *Perk Foods Co.*, 283 F.Supp. 100 (N.D. Ill. 1968), *rev'd.* 419 F.2d 944 (7th Cir. 1969) cert. den. 397 U.S. 1038.

At p. 152 in the *A & P* case, the Supreme Court specifically stated that it is entirely possible that old elements "especially in . . . electronics, take on some new function or quality from being brought into concert." The Supreme Court then defined precisely what is invention in such a new combination of old electronic elements; namely, (1) "only when the whole in some way exceeds the sum of its parts"; (2) "any unusual or surprising consequences from the unification of the elements"; and (3) "any additional or different function in the combination than they (old elements) perform out of it".

The District Court applied each of these very specific tests:

| *A & P Test* | *District Court* |
|---|---|
| "*exceeds the sum* of its parts" | "Holtje's system joined the methods of two systems that had seemed alternative . . . and achieved *more than the sum of* the separate advantages claimed for each." (A. 40a). |
| "*unusual or surprising* consequences from the unification of the elements" | "Holtje united the familiar elements of his system under a *novel and surprising* mode of cooperation, that produced a new and advantageous result." (A. 26a). |
| "any additional or *different* function in the combination than they (old elements) perform out of it." | "(Holtje's) . . . is a deft and imaginative union of elements that was *not* suggested by or *inherent in their nature and previous uses . . .*" |
| | "not . . . the same feedback function . . . or an equivalent feedback function . . . a *different* result through a *different* mode of operation" (A. 46a, 16a). |

Thus, even the standards of the *A&P* case were fully met in this instance, though all this was ignored as if non-existent by the Court of Appeals.

It is believed imperative, furthermore, for the Supreme Court to settle promptly whether, as held in *Graham* v. *Deere,* Section 103 is or is not now the sole test of invention for "*new*" combinations not found in the prior art, under the Patent Act of 1952. Otherwise, the courts of the Second Circuit and of other circuits which give great weight to Second Circuit decisions, are bound to follow the precedent and technique in this case, subverting the intended uniformity of test of invention that was to have been stabilized by the Supreme Court in the *Graham* case.

## REASONS FOR GRANTING THE WRIT

Several compelling reasons have already been enumerated.

There seems to be the serious misunderstanding (contrary to prior holdings of the Supreme Court and current holdings of other Courts of Appeals), that, though non-erroneous findings of fact, as enjoined by Rule 52(a), may not be set aside, they may, however, be ignored—with the constitutionality of such arbitrary elimination of the fruits of a "civil action" provided for by statute seriously in question. By granting this petition, this Court may correct that misunderstanding before it becomes a highly mischievous practice in appellate litigation.

Though 35 U.S.C., § 103, was enacted in 1952, and though this Court's interpretation thereof, *Graham* v. *Deere,* dates from 1966, the opinion of so prestigious a court as the Court of Appeals for the Second Cir-

cuit in this case demonstrates that at least some of our courts still misunderstand the nature of the stability that Congress intended to introduce into the law by that new legislation, and, in particular, the uniform test intended for "*new* combinations". By granting this petition, this Court will become enabled promptly to correct this misunderstanding. In the absence of such prompt correction, the decision of the Court of Appeals, by very reason of its prestige, will become an undesirable and confusion-spawning precedent, and all the labor of Congress in enacting this new statute, and all the labor of this Court in interpreting it, will have been in vain.

Since this is one of the dominant electronic power supply inventions in wide current use, intervention by the Supreme Court at this time will make unnecessary cluttering of the courts with additional suits against other defendants in other circuits to restore, in effect, the District Court's decision and thus to achieve a conflict decision.

## CONCLUSION

Wherefore, your petitioner prays that a Writ of Certiorari issue to the Court of Appeals for the Second Circuit, to the end that this cause may be reviewed and determined by this Court; that the judgment of the Court of Appeals for the Second Circuit be reversed; and that your petitioner be granted due process and such other and further relief in the premises as may be just and proper.

Respectfully submitted,

ROBERT H. RINES
DAVID RINES
*Attorneys for the Petitioner*

*Of Counsel:*

RINES AND RINES
No. Ten Post Office Square
Boston, Massachusetts 02109

JULIUS FOSTER
101 Park Avenue
New York City, New York

NELSON H. SHAPIRO
Shapiro and Shapiro
640 Washington Building
15th and New York Avenue, N.W.
Washington, D.C. 20005

PAUL J. FOLEY
Belen and Foley
840 Pennsylvania Building
425 13th Street, N.W.
Washington, D.C. 20004

RICHARD S. PHILLIPS
Hofgren, Wegner, Allen,
Stellman & McCord
20 North Wacker Drive
Chicago, Illinois 60606

## APPENDIX A

**(The Opinion of the Court of Appeals and Orders Denying Rehearing)**

IN THE
UNITED STATES COURT OF APPEALS
FOR THE SECOND CIRCUIT

---

No. 24—September Term, 1970.

(Argued September 17, 1970 Decided November 27, 1970.)

Docket No. 34500

---

GENERAL RADIO COMPANY, *Plaintiff-Appellee,*

v.

KEPCO, INC., *Defendant-Appellant.*

---

Before:

FRIENDLY, SMITH and HAYS, *Circuit Judges.*

---

Appeal from a judgment of the United States District Court for the Eastern District of New York, John F. Dooling, Jr., *Judge,* holding plaintiff's patent valid and infringed by defendant's line of power supplies.

Reversed.

---

JOSEPH R. MCPHEE, JR., Garden City, N. Y. (Andrew Perl, on the brief), *for Defendant-Appellant.*

ROBERT H. RINES, New York, N. Y. (Rines and Rines, Boston, Mass., Julius F. Foster, New York, N. Y., on the brief), *for Plaintiff-Appellee.*

HAYS, *Circuit Judge:*

This is an appeal from a judgment of the United States District Court for the Eastern District of New York, holding plaintiff's patent 2,942,172 valid and infringed by defendant's line of power supplies.

The plaintiff, a Massachusetts corporation with its principal place of business in West Concord, Massachusetts, is engaged in the manufacture and marketing of electronic apparatus.

The defendant, Kepco, Inc., is a New York corporation having its principal place of business and its manufacturing facilities in the Eastern District of New York. During the period in question, the defendant specialized in the production of a line of regulated power supplies and in 1960-68 was one of the best known sources of power supplies. After Kepco introduced power supplies similar to the plaintiff's, plaintiff sued for infringement of the patent in suit. Defendant answered, asserting the defenses of invalidity and noninfringement. From the court's finding of validity and infringement, the defendant appeals. We agree with the defendant and reverse.

Plaintiff's patent was issued on June 21, 1960 to Malcolm C. Holtje, an employee of General Radio, and assigned to the plaintiff. The function of the patented device referred to as a power supply is to convert alternating current, the kind normally supplied by public utilities, to low voltage direct current, which is useful in a wide range of electronic equipment. The device seeks to maintain the output dc voltage constant in magnitude even though fluctuations may occur in the ac voltage or in the equipment to which the dc voltage is supplied.

The patented power supply has three main parts, a rectifier stage and two regulator stages. The invention claimed by plaintiff is the combination, in a new way, of these stages, each in itself previously well known.

The details of the patent are fully described in the findings of the district court. The first stage of the power supply consists essentially of a transformer for increasing the magnitude of the ac voltage, rectifier tubes for converting the ac voltage to unregulated dc voltage and a capacitor, called an energy storing device, which serves to reduce the fluctuations in the dc voltage. The next stage, between the capacitor and the regulated dc output, includes a vacuum tube in a circuit known as "a series pass-element," the function of which is to keep the dc voltage output constant in magnitude. The third stage controls the voltage across the vacuum tube of the second stage by feeding back the fluctuations in that stage to the rectifier tubes in the first stage.

The relevant prior art includes patent No. 2,511,850, issued to Hoag more than five years before the Holtje application was filed, and patent No. 2,850,680 issued to Woll antedating the Holtje patent by about two years. Hoag describes a rectifier stage like Holtje's and a series-pass element serving the same function as the series-pass element in the patent in suit. In combination with these, there is, as in Holtje's patent, an additional regulating circuit which samples the voltage variations across the pass-element to control the amount of the ac voltage applied to the rectifier tubes in order to control, in turn, the voltage across the vacuum tube of the series pass-element.

The only difference between Hoag and Holtje is that Hoag applies his feedback control to the ac input of the transformer while Holtje applies it to the rectifier tubes. It appears to us that the patent examiner was right when he said:

> "[W]hether the feedback means are used to control the output of a voltage controller or to control the grids and thus the firing angle of the switching means as in Holtje would not be deemed invention since they would be fully equivalent to each other in their operation and results."

But even if the difference in the point of application of the feedback control were considered sufficient to constitute invention, the Woll patent, while differing in certain other respects, shows that control applied, as in Holtje, to the rectifier stage. The main difference between the two patents is that in Woll a shunt-regulator is used rather than a series regulator in Holtje. Holtje shows a shunt-regulator in his application and states that his invention applies both to shunt and series regulators. In testimony at trial, Holtje admitted that the choice of a series or shunt regulator is purely a question of engineering.

Both Woll and Holtje directed their efforts toward solving the problem of energy dissipation in the series-regulator in regulated power supplies. Woll considered his circuit as an improvement on the Holtje patent, and described his improvement as follows:

> "While it is possible to regulate the voltage output of a thyratron rectifier by means of variable resistance series regulator tube, connected between the source of unregulated voltage and the positive output terminal of the power supply, the amount of current that may be drawn from the power supply is limited by the current carrying capacity of the variable resistance series tube."

If the shunt regulator tube of Woll is replaced with a series-regulator tube, the Woll patent describes Holtje in every significant detail. The fact that the series-regulator was not specifically claimed by Woll is not determinative, for the device was disclosed in the specification and is thus public property. *Miller* v. *Brass Co.*, 104 U.S. 350, 352 (1882).

It is agreed that all of the elements in the patent in controversy had long been known in the art, but it is asserted that they are combined in such a way as to merit the term invention. To be upheld, the patent must meet

the test of nonobviousness for combination patents set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1 (1966), interpreting § 103 of the Patent Act of 1952, 35 U.S.C. § 103 (1964). The statute provides that no patent shall issue where "the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." 35 U.S.C. § 103 (1964).

One of the patents examined in *Graham* v. *John Deere, supra,* was for a new combination of old elements in a pump sprayer, the kind used on top of window-cleaner bottles. Even though the combination there was "the first commercially successful" pump of its kind and even though the lower court found the device to be a "unique combination of . . . old features [solving] problems which for years beset the insecticide industry," 383 U.S. at 29-30, the Court found the device was anticipated in the prior art. The Holtje patent is a "new combination" of a similar kind.

The patent in suit is invalid in view of the teachings in the patent to Hoag, for any material in the patent in suit would be fully obvious to one skilled in the art familiar with Hoag and thus falls within the provisions of 35 U.S.C. § 103. The Supreme Court has said: "Courts should scrutinize combination patent claims with a care proportioned to the difficulty and improbability of finding invention in an assembly of old elements." *Great Atlantic and Pacific Tea Co.* v. *Supermarket Equipment Corp.*, 340 U.S. 147, 152 (1950). Applying that test, the combination of old elements here does not meet the test of invention required for patentability.

Since we have determined that the patent in suit is invalid, we need not discuss the claim that the patent was infringed.

Reversed.

UNITED STATES COURT OF APPEALS
SECOND CIRCUIT

No. 34500

GENERAL RADIO CO., *Plaintiff-Appellee,*

v.

KEPCO, INC., *Defendant-Appellant.*

A petition for a rehearing containing a suggestion that the action be reheard in banc having been filed herein by counsel for the appellee and no active circuit judge having requested that a vote be taken on said suggestion,

Upon consideration thereof, it is

Ordered that said petition be and it hereby is denied.

/s/ J. EDWARD LUMBARD
Chief Judge

January 6, 1971

---

UNITED STATES COURT OF APPEALS
SECOND CIRCUIT

No. 34500

GENERAL RADIO CO., *Plaintiff-Appellee,*

v.

KEPCO, INC., *Defendant-Appellant.*

A petition for a rehearing having been filed herein by counsel for the appellee,

Upon consideration thereof, it is

Ordered that said petition be and it hereby is

DENIED.

/s/ .....
Henry J. Friendly

/s/ .....
J. Joseph Smith

/s/ .....
Paul R. Hays
Circuit Judges

January 6, 1971

## APPENDIX B

### Findings of Fact, Conclusions of Law and Order for Judgment

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF NEW YORK

---

SAME TITLE

---

The following are the findings of fact herein:

1. Plaintiff is a Massachusetts corporation having its principal place of business in West Concord, Massachusetts. It is engaged in the manufacture and marketing of electronic apparatus. It did not at the times in question specialize in making a line of regulated power supplies, and it was not in the years 1960-1968 well known in the industry as a source of power supplies.

2. Defendant is a New York Corporation having its principal place of business and its manufacturing facilities in New York and in the Eastern District of New York. Defendant at the times in question has specialized in the production of a line of regulated power supplies, and in 1960-1968 was one of the best known sources of such power supplies.

3. Defendant manufactured the allegedly infringing devices in the Eastern District of New York.

4. United States Patent No. 2,942,172 was issued on June 21, 1960, on the application of Malcolm C. Holtje as inventor filed February 26, 1956. Holtje was at the time he did his work on the subject matter of the patent and still is an employee of plaintiff. The patent was assigned at or before issue to plaintiff and is owned by plaintiff.

5. Plaintiff does not claim a date of invention earlier than February 26, 1956, the date of the filing of the Holtje application.

6. The subject matter of the patent lies in the field of electronic power supplies involving the conversion of alternating current energy, such, for example, as regular public-utility line supply, into regulated direct-current energy.

7. Plaintiff's patent is on a power supply which includes a rectifier stage, by which the line-supply of alternating current is converted into unregulated direct-current, and a second, following stage in which the direct-current voltage output of the power supply is regulated; teaches the union of (1) known means of regulating voltage at output through the use of a "series pass element" or voltage-regulator operating in the second stage as a resistance so variable in relation to variations in voltage at the output that the sum of the voltage at output and the voltage across the series pass element equals the unregulated voltage input into the second stage, and (2) known means of controlling otherwise unregulated direct-current output of a rectifier by varying the length of time during each cycle of the alternating current input that the unidirectional rectifying elements are capable of conducting (i.e., control through varying the "firing angle" or "phase angle" or "firing time" of the rectifier elements). Except marginally (see finding 11 B *infra*), earlier power supplies had not united such coacting voltage-at-output regulation and control of the rectifier output of unregulated direct-current voltage through control of the rectifier means.

8. The operation of the power supply of the patent in one greatly simplified schematization, as given in Fig. 1 of the patent and described in the specification, is as follows:

A. Numerals 1, 3, 5 identify the primary and secondary windings of a transformer connected to a source of alternating current (symbolized by the sine curve at the extreme left), such as an ordinary electrical outlet through

which public-utility electrical power is supplied. Top and bottom of the secondary winding 5 are connected to the "plates" or anodes 7, 9 of twin gas-filled vacuum tubes ("thyratrons") 11, 13. The center point of the secondary winding 5 is connected to ground 2 (Numerals 23 and 31 designate a common ground with 2 although shown separately).

The vacuum tubes 11, 13 are "thyratrons" and can conduct only in one voltage-direction; as alternating current changes voltage-direction or polarization at a constant rate (e.g., 60 cycles a second), a thyratron connected directly to such a power source could conduct not more than half the time. Grounding the center of the secondary winding in effect divides it into two secondaries, and each is paired in operation to one of the thyratrons. So, as the current alternates, making first the top of the secondary winding positive and then the bottom of it positive the plates of the two unidirectional thyratrons, connected to opposite ends of the secondary winding, conduct alternately, and thus together conduct during the full cycle of alternation by taking turns at conducting. Since they are unidirectional, the thyratrons together deliver a direct-current power that, however, rises from zero to maximum potential and returns to zero twice in the time of each full alternating current cycle.

B. The cathodes 15, 17 of the thyratrons 11, 13 are connected together 19 and through a capacitor 21 to ground 23 (the common ground with 2 and 31).

The capacitor 21 is a storage capacitor which is so sized that it will maintain the voltage input to the series regulator element 25 during the intervals of thyratron non-conduction in each half cycle, so smoothing the direct-current output of the rectifier. The capacitor stores electrical energy as electrons; storage builds when the voltage of the rectifier is above that of the capacitor, and when the voltage of the rectifier is below that of the capacitor, the capacitor-stored voltage is available to meet the load demands.

C. The cathodes 15, 17 of the rectifier tubes 11, 13, are connected together 19 and to the plate or anode 33 of the regulator-tube 25 by connection 35, and the cathode of the regulator-tube is connected to the upper output terminal at 27; the other output terminal 29 is connected to ground at 31 (a common ground with that 23 of the capacitor 21 and that 2 of the connection to the centerpoint of the secondary winding 5).

D. The output voltage of the power supply (across 27, 29), which can be adjusted manually by varying the potentiometer 43, and taken across the resistor network 41, 43 connected between the output terminals 27, 29, is, in effect, sampled continuously by taking the predetermined fraction of the whole output voltage drop registered from the tap 45 to output terminal 29 (and ground 31). The sample (or predetermined fraction) of output is continuously compared with the reference voltage 46 and the difference between it and the reference voltage is amplified at 47, and the amplified voltage is conducted 16 to the control grid 49 of the series pass regulator tube 25.

The variations in the potential of the grid produce related variations in the resistance of and the voltage drop across the series pass regulator-tube 25; if output voltage is decreased, the voltage drop across the regulator-tube 25 increases, keeping the sum of the two voltages equal to the unregulated direct-current input at 19; conversely, increase in output voltage is compensated by diminution in voltage drop across the regulator-tube. The response time is very rapid; it can be as little as millionths of a second.

E. A feed-back is provided from the output at 27 through conductor 51, source of potential 57, conductor 18, resistance-capacitance phase-shifting networks 6, 8 (across the secondary winding 4 with center-tap 20, connections at 12, 16) and conductors 10, 14 to the grids 53, 55 of the thyratrons 11, 13.

Since, at any moment of time, output at 27 is maintained at the voltage fixed at the potentiometer 43 by the action of the voltage regulator-tube 25, and since the potential 57 is constant, the potential of the grids 53, 55 of the thyratrons 11, 13 is maintained constant for that moment of time; hence, any variation found in the voltage input to the regulator-tube 25, that is, any change in the voltage across the capacitor 21, will be present too at the directly connected cathodes 15, 17 of the thyratrons 11, 13 and the change in grid-to-cathode voltage of the thyratrons will result in a corresponding advance or retardation of the firing time (i.e., increase or decrease the firing angle or phase angle) of the thyratrons, increasing or decreasing the voltage output of the rectifier compensatingly so that the voltage drop across the regulator-tube 25 (i.e., 19 to 27) is held to a relatively small variation no matter how widely from moment to moment the voltage drop across the output terminals 27, 29 is varied.

The thyratrons so respond to the feed-back because each thyratron is unidirectional, conducts only when the a.c., input to it is in one of its two phases, can at most conduct only during that time within one half-cycle when the potential (rising from zero to maximum and diminishing again to zero) is above the average d.c., value of the rectified but fluctuating voltage (approximating the smoothed out voltage across the capacitor 21), and, within that maximum conduction time can, by control exerted through variations in the grid voltage (at 53, 55), be prevented from starting to conduct until the electronically pre-selected phase angle in the half-cycle is reached. The response time of the thyratrons to the feed-back is in the order of one half to one cycle of input a.c., (e.g., if the a.c., is 60 cycle, 1/120 to 1/60 second), and is relatively slow if compared to the millionth of a second order of response time that can be designed into the second or series pass regulator stage of the power supply. The electronic signal or information that determines the firing time or angle or phase angle of the

thyratrons 11, 13 through the control grids 53, 55 is derived from the d.c., voltage across the series pass regulator-tube 25.

F. The power supply of the patent is characterized by its compactness, its ability to supply a finely regulated direct-current output over the whole range of its rated power output (e.g., in plaintiff's commercial Type 1205-B Adjustable Regulated Power Supply, 0 to 300 volts at 200 milliamperes) while keeping the voltage drop across the series pass element (regulator tube) within a narrow range of variation and holding the power dissipation within a narrow range of variation regardless of the output voltage setting or line voltage variations.

9. The novelty in the power supply of the patent centers around the concept of introducing into power supplies that combine the use of switching rectifiers (of which thyratrons are a sub-class) and series pass or shunt regulator elements (as exemplified, for instances, in defendant's ABC and CK power supplies, as schematically shown in its catalog B-657, and defendant's HB, KR, and "Wide Range Vacuum Tube" power supplies, as schematically shown in its catalog B-619), a feedback from the direct-current output voltage (in addition to the feed-back of a sample taken across output to furnish fast-responding output voltage regulation through varying the voltage (and resistance) across the pass element by controlling the grid (or other gating) of the pass element) to control the voltage of the switching rectifiers in response to the variations in the direct-current voltage drop across the voltage-regulator element.

10. The primary usefulness of the invention lies in

A. Radical decrease in the amount of power dissipation (which usually occurs as heat produced in the series pass element) required to compensate for reductions in output voltage (for the sum the voltages (resistances) across output and the pass element must equal the unregulated power input to the pass element) by so controlling the input of

voltage to the pass element that the series pass element needs to vary over only a narrow range to balance voltage output to voltage input; the result is that the power supply uses a series pass element (tube or transistor) of modest rating (roughly in the range indicated by the potential of source of potential 57), bulk, and heat dissipating characteristic. The restriction of the quantity of the heat dissipation of power through control over the unregulated voltage input to the pass element stage makes possible the design, with a minimum of pass element tubes or transistors and of mechanical heat diffusers (such as fans), of highly flexible power supplies that can operate with substantially constant efficiency and heat dissipation over the whole range of their power from nearly zero to rated maximum voltage; while economy in use of line-supply of alternating current may, apparently, not be important in power supplies of the size-order involved and in the uses indicated, the control of rectified output is not at the expense of a dissipation of power elsewhere in the system but at the expense of the amount of raw a.c., input taken up at input transformer secondary winding; and

B. As compared with earlier power supplies that would avoid excessive heat dissipation of power by controlling rectifier output in accordance with the voltage across the output terminals (see e.g., defendant's KO power supply as schematically shown in its catalog B-657, and KM power supply (?) as schematically shown in defendant's catalog B-619), the provision of finely controlled swiftly responsve output voltage regulation free of transients and spikes and with low output impedance, without requiring the bulky and complex filtering system and high capacitance—with consequent high output impedance—needed to eliminate "spikes" and transients produced by applying output directly to the relatively slow-responding switching rectifiers found in the earlier power supplies that regulated the rectifiers by the voltage across output, the basic response-time of the earlier rectifier-control supplies of the kind described

was determined by the cycling time of the a.c., line supply (e.g., with 60 cycle a.c., line supply, 1/120 to 1/60 of a second).

11. The invention of the patent was not anticipated in the prior art.

A. *Hoag,* 1945, 1950, No. 2,511,850 (Ex. A) was cited against Holtje's application in the patent office as exhibiting a series pass regulatory tube (21 in Hoag's Fig. 1, 25 in Holtje's Fig. 1) and a feedback (via conductors 24) connected across the series pass regulator tube 21 "to control the voltage obtained from the rectifier means in accordance with variations in the voltage across the series (pass) tube, thereby limiting the range of voltage developed across the series (pass) tube," and Hoag, alone and in combination with other patents was made a ground for rejecting all claims (save original 22 through 25, rejected as "drawn to the inherent function of the claimed apparatus") except those now appearing in the patent, which were allowed in the same action that rejected the other claims on Hoag. The Examiner asserted there was no patentable invention over Hoag's showing the feedback used to control the output of a voltage controller to the rectifier in Holtje's using the feedback to control the firing time of the rectifiers. Holtje did not debate the point but canceled the rejected claims, electing to take the nine claims proposed to be allowed over Hoag as adequately claiming the invention and saying that the cancellation of the rejected claims was "thus not to be construed as a disclaimer."

See findings 12 to 14, *infra.*

(1) Hoag's objects were very like Holtje's, and, in a power supply that included (1) unspecified but indicated "Rectifier Filter" (parallel to what appears in Holtje Fig. 1 as the transformer 1, 3, 5, the thyratrons 11, 13, the storage capacitor 21 and unregulated d.c. output point 19) and (2) a series pass regulator tube and feedback voltage regulator means (Hoag's regulator tube 21, error voltage

amplifier including tubes 39, 46 and circuitry, resistances and capacitors between output voltage divider 36 and regulator tube 21 control grid 50, and the box Auxiliary Voltage source, detailed in Fig. 2 of Hoag, parallel to Holtje 25, 43, 45, 47 connecting from output voltage divider tap at 45 to regulator tube control grid 49, and reference voltage 46), Hoag clearly presented means "for varying the alternating input voltage *to* the rectifier unit as a function of the voltage drop across the series regulator tube" (Hoag Col. 2, 11. 47-50; italics added).

(2) Hoag illustrated (Fig. 3) and described in detail (Col. 6, 1. 40 to Col. 7, 1. 34) "a servo mechanism * * * responsive to the voltage drop across the series regulator tube * * * to vary the setting * * * of an auto-transformer" (indicated at Fig. 3, numeral 82; see Ex. 5 two lower sketches) "or other suitable alternating current voltage divider interposed between the alternating-current line and the input to the rectifier-filter portion of the power supply" (Col. 2, 1. 50 to Col. 3, 1. 2), Hoag also indicated, but did not describe, the use, in lieu of the servo mechanism, of either "a saturable-core reactor or transformer, or a variable capacitor "for varying the alternating input voltage *to* the rectifier" (Col. 3, 11. 2-5; italics added). Hoag visualized use of the saturable-core reactor as a means of varying a.c., input voltage *to* the rectifier; the evidence does not state nor does Hoag indicate, how the voltage drop across the regulator tube would be fed back as a control means, to the saturable reactor but presumably it would be applied as "signal" or "D-C control" magnetomotive force to the core of the saturable-core reactor (see Ex. I, Fig. 2, Fig. 3, p. 2, Col. 1, p. 5, Col. 2).

(3) Hoag does not teach the central novel concept of the power supply of the patent (see findings 8E, 9, *supra*), and he does not present or indicate the electronic control means of the power supply of the patent (see finding 8E, *supra*).

(4) Hoag's specific servo mechanistic means would not have cycle-by-cycle response; its response time would be dependent on the action time of the relay circuitry (Hoag, Fig. 3, and its motor 84, and the autotransformer control lever) (Hoag, Col. 6, 11. 44-52, 74-75, Col. 7, 11. 1-26).

(5) Hoag does not control the voltage of the direct-current output of the rectifier stage through feedback control of the firing time or angle or phase angle of the switching rectifiers, but controls the amplitude of the alternating current input to the rectifier, substituting automatic servo mechanistic means for a manual control, and indicating the availability of other means of controlling.

(6) Hoag's attainment of the goal of radically reducing the power dissipation in the series regulator stage while avoiding the high output impedance, spikes and transients and elaborated capacitance elements of systems that regulated the rectifier through-put by feedback of the voltage drop across the output, was at the cost of introducing a pre-rectifier stage involving the use of an autotransformer, motor, and relay circuitry, or other indicated equipment, that appears to have denied commercial success to the apparatus of his patent, while the manually operated ganged tap switch a.c., input, d.c., output voltage range selected which Hoag's device was to supersede (Col. 1, 11. 45-54) evidently survived (see, e.g., defendant's HB Power Supply, Catalogs B-631, p. 18, B-657, p. 20, Exs. 22, Ex. 3 sub-ex. 2).

(7) Hoag's disclosure of a way of reaching the objectives he had in common with Holtje did not use the same feedback function that Holtje used or an equivalent feedback function but, to the extent it reached the objectives common to Holtje and Hoag, did so by producing a different result through a different mode of operation.

(8) The claims of the Holtje patent in suit (Claims 1 through 4) cannot be read on Hoag because all the Holtje claims require that the feedback means that exerts control

on the thyratron power production be connected between the output and the switching means (or rectifying means) and Hoag, as the very point of his control requires the feedback to regulate the voltage of a voltage controller connected between the a.c., source and the input to the rectifier filter.

B. *Woll,* 1954, 1958, No. 2,850,680, Ex. J, a co-pending application that issued as a patent some months before the Patent Office cited Hoag against Holtje's application, was not cited in the patent office.

(1) Woll's power supply was presented as particularly useful in the supply of energy at a high current rate with a minimum of heat dissipation and as overcoming the disadvantage experienced in using the conventional variable resistance series regulator tube with its waste of energy through heat dissipation and its limited range of operation, particularly when linked with thyratron rectifiers. Another object of Woll was to provide separate means of compensating for fluctuations in output voltage at frequencies below and above the rectification frequency.

(2) Woll teaches the use of a thyratron rectifier stage and feedback of a sample of the output of the power supply to the grids of the thyratrons to control the firing time or angle or phase angle of the thyratrons responsively to the variations in voltage output of the power supply occurring at frequencies at or below the rectification frequency; and the separate use in the same supply, to control ripple voltage fluctuations and fast transient voltage changes occurring at frequencies greater than the rectification frequency, of a variable impedance device connected across the output terminals, the impedance varying inversely with the output sample variations.

(3) Woll does not control the thyratrons through his feedback means in accordance with the voltage across the voltage regulator means (i.e., the series pass element 25 of Holtje, which is not present in but is designedly

eliminated by Woll); Woll controls the average conduction of the thyratrons by the voltage fluctuation of the d.c., output of the power supply, and does not invoke the central concept of Holtje. See findings 8E, 9, *supra.*

(4) To deal with voltage fluctuations or transients at a frequency higher than the frequency of the rectifier (determined by the cycle time of the input a.c.), which could not be dealt with by the relatively slow-responding thyratron feedback control, Woll provided (see his Fig. 2) an amplifier tube 76, a capacitor 78 linked to a resistor 80 and with it forming a voltage divider across the output and connected to the cathode of the amplifier 76, the grid of which is grounded; the anode of the amplifier 76 is connected to the grid of the tube 34 through a coupling capacitor 84 (the grid of tube 34 is also grounded through a resistor 86), the anode of tube 34 is connected to output and the cathode, through a resistor 88 and by pass capacitor 90, to ground; the tube 34 functions as an impedance across output the voltage conduction through which varies inversely with that of the output voltage in response to changes at frequencies higher than rectification frequency which are communicated to the control grid of 34 by means of alternating-current coupling to the tube 34 (i.e., by a.c., paths across capacitors 78.84). (Fig. 3 of Woll illustrates additional circuitry designed to deal with decreases in output through a coupled tube 94 used as a shunt regulator, tube 34 being cut-off when tube 94 operates.) While Woll is designed to cover changes in input and output voltages at substantially all frequencies, and employs a shunt regulator estimated to reduce by one-half the heat dissipation involved in using a series pass regulator tube, a specific object of his system is to eliminate the series pass regulator tube and, instead of using the conventional engineer's alternative of a shunt regulator (as shown in Holtje Fig. 2), to devise a novel a.c. coupled shunt variable impedance that would operate in frequency selective response to a frequency-fractionated portion of the sample capacitor-divided from the output

voltage rather than, as a conventional output voltage regulator operates, to keep d.c., output voltage in balance with unregulated d.c., input voltage by varying in voltage inversely with output voltage variance. In consequence Woll cannot be translated into a series pass power supply (as presenting an engineer's alternative that is a functional equivalent) without eliminating precisely Woll's inventive advance and using a second stage voltage regulator tube that would be d.c., connected rather than a.c., coupled and would compensate at all voltage change frequencies rather than selectively.

(5) Woll's variable impedance 34 across the output 18, 22 operates transitionally because it is a.c., coupled (Woll, Col. 6, 11. 56-61), and the switching rectifiers 10, 12 are relied on to assume regulation of the transient voltages as the "shunt regulator tubes (34, 94) gradually release their control" (Col. 6, 11. 61-67); Holtje's power supply purposively retains intact the continuously operative conventional series pass regulation system with the undeniable advantage of its swift response voltage stabilizing regulation, but Holtje re-sets it in a new power supply in which, by controlling (within a cycle to half-cycle's time) the unregulated d.c., voltage passed to it, he enables the conventional system to function at maximum efficiency over the total range of output voltages, with dissipation limited to a very narrow range of variation and to minimal quantity; where Woll expected to halve the wanted heat loss (Col. 7, 11. 31 to 36) Holtje anticipated that the ratio of power dissipation in the series regulator tube of the conventional power supply to the dissipation in the power supply of the patent would be 8.5 to 1 (Col. 3, 1. 74 to Col. 4, 1. 6).

(6) Holtje feeds back the control data of two different d.c. voltages, voltage variations across output and voltage variations across the series pass element; Woll feeds back data only from voltage output.

(7) The claims of the patent in suit (claims 1 and 4) cannot be read on the device of Woll's patent because it does not embody feedback means connected between the output and the switching means or rectifying means to control the voltage obtained from the switching or rectifying means in accordance with the variations in voltage across the voltage-regulator means or regulator tube, but rather Woll uses means to feedback degeneratively a sample of the d.c. output voltage to control the voltage obtained from the switching or rectifying means, and does not embody a feedback means connected between the output and the voltage-regulator means (or regulator tube) for controlling that means (or tube) in accordance with the variations in the voltage at the output but embodies a sample voltage output feedback means capacitively coupled to the regulator tube (variable impedance means) to vary the tube's impedance inversely in response to output voltage fluctuations at frequencies higher than the frequency of rectification.

(8) Deletion of Woll's capacitively coupled variable impedance (or shunt regulator tube) and using instead a series pass regulator tube connected between the switching means 10, 12 and output and to the reference voltage and amplifier (as in Ex. K-1 and in "breadboard" K-3) does not equate Woll and Holtje but deletes from each the element which characterizes (without constituting or wholly encompassing) the patentees' claimed advances over the prior art.

12. The application claims of the patent allowed as Claims 1 through 9 (that is, 5, 7, 13, 16, 17, 18, 19, 20 and 21) all recite "energy-storing means for storing the energy from the switching means" (application Claims 5, 7) or "energy-storing means for storing the rectified voltage" (application Claims 13, 16, 17, 18, 19, 20 and 21); the energy storing means is the capacitor 21; and all the allowed claims locate the voltage regulator tube (series or shunt) as connected between the capacitor and the out-

put; no disallowed application claim on power supply (disregarding the method claims 22-25 rejected on a wholly unrelated ground) recited the energy-storing means; all the allowed claims (disregarding the rejected method claims) distinguish over Hoag on the ground seemingly treated by the Examiner in rejecting application Claims 1 and 2 on Hoag as insufficient to show patentability, and they, additionally, distinguish from rejected application Claims 1 and 2, but do not distinguish over Hoag (who implies such a means or an equivalent in his generalized inclusion of a "Rectifier and Filter" in his power supply), in having an energy storing means for storing rectified voltage (or energy from the switching means); all allowed claims present, with variations in limitations and in the specificity of the delineation of the elements of the claims, a single subject matter of claimed patentable inventiveness as stated in the specification, in the reply to the first office action (rejecting all claims), in differentiating the art cited and discussed in the second office action, and as presented during the trial. See finding 9, *supra.*

13. Hoag was first cited in the third office action (in which the claims in the issued patent were stated to be allowable) as the ground for rejecting application Claims 1 and 2 and as a sufficient ground for rejecting application Claims 6, 8, 9, 10, 14 and 15; the stated ground for rejecting Claims 1 and 2 was that Hoag was their "full equivalent" in that Hoag taught the employing of a series impedance tube 21 and a feedback means 24 connected between the output and a voltage controller 10 to control the voltage obtained from the rectifier in accordance with variations in the voltage across the series impedance tube thereby limiting the range of voltage developed across the series impedance tube; the Examiner stated that whether the feedback means are used to control the output of a voltage controller 10 (Hoag Fig. 1) or to control the grids and thus the firing angle of the switching means (as in Holtje) would not be deemed invention "since they

would be fully equivalent to each other in their operation and results."

A. No application claim was amended during the prosecution; the nine claims allowed were allowed in the form in which they were presented as part of the application.

B. The allowed claims are not uncertain in meaning or ambiguous.

C. The Examiner's expressed reason for rejection of application Claims 1 and 2 (and underlying the remaining rejections), was essentially that Holtje could not, in view of Hoag, validly claim broadly a voltage regulated power supply using feedback of the variations in voltage across a series pass regulator element to limit the range of voltage across the series pass regulator element, because if Holtje claimed so broadly, the Hoag system became a "full equivalent," and the choice of mode of control of the d.c. production (a choice between alternatives of control known in the art, i.e., by exerting the feedback control on either a pre-rectification voltage controller or else on the grids of the rectifiers) would be a non-patentable choice between known operation-and-result equivalents; since the Examiner was in the same action determining that Holtje presented patentable subject-matter, i.e., matter not anticipated in or made obvious by Hoag's disclosure, and was allowing nine application claims in form as applied for originally, the rejection of claims does not imply that the allowed claims were read and allowed with the restriction that they be interpreted to exclude all patentable subject matter present but imperfectly delimited in the rejected claims.

D. The Examiner did not explain the ground on which he found that patentable subject-matter was allowably claimed in the nine claims that he allowed; the capacitor is recited in all allowed and in no rejected claims; the function of the capacitor (energy-storing means) 21 in the operation of the power supply is stated in Holtje Col.

3, 11. 14-31; the specification relates the capacitor integrally to the critical potential between the grid 53, 55 and cathodes 15, 17 of the switching tubes 11, 13 in terms both of rectifier input to series pass regulator tube 25 and of maintenance of a predetermined voltage differential between anode 33 and cathode 37 of the series pass regulator element 25; the feedback means is connected to the grids 53, 55 of the switching means 11, 13 (Holtje, Col. 2, 1. 72, Col. 3, 1. 6), which are thereby caused to maintain the anode 33 of the series regulator element 25 at a more positive predetermined potential than the cathode 37; the operation of the capacitor 21 is pivotally related to the combined switching means-to-output and feedback from output-to-switching means path; specification of the capacitor in the claims imports into them as a limitation such a feedback control means as functions in the fashion of a firing angle control integral to the operation of the rectifying means; additionally, the specification of the capacitor in the claims clarifies and limits their interpretation (as against the rejected claims) to a set of stated connections that more distinctly required connection of the feedback from output to the switching means itself as distinguished from the input to the switching means. Note Claims 9, 10 and 13 of Hoag as related to the Examiner's broad reading of Holtje application Claims 1 and 2.

13. The claims of the patent are not by reason of the file history definably narrowed in their interpretation but were allowed in their ordinary intendment when read in the light of the specification.

14. In power supplies for the electronic field uses, to which plaintiff's power supply of the patent and defendant's power supplies were primarily addressed, large-scale heat dissipation in the series pass regulator element had long been recognized as undesirable; it imposed a requirement for the use of large tubes, multiple tubes and large enclosures, involving increased costs, and inconvenience;

the power supplies were relatively inflexible and not of constant efficiency over wide voltage ranges and widely variant heat dissipation conditions.

15. A number of methods of reducing or avoiding heat dissipation were devised and used, including power supplies in which manual gang-switches coordinated changes in level of output voltage with changes in the amplitude of the a.c. input voltage to the rectifier, by voltage-selector taps on the transformer secondary winding; power supplies in which manually operated autotransformers or mechanically coupled autotransformers were used ahead of the rectifier to control the amplitude of a.c. input to the rectifier; the earlier expedients were not satisfactory where a wide range of output voltage availability and continuous voltage variability were desired coupled with swift response to input and load variations and output voltage changes and with fine control of output voltage in time-response and voltage deviation; the earlier expedients that used autotransformers or other devices ahead of the rectifier additionally involved additional equipment, cost and bulk.

16. The person having ordinary skill in the art to which the Holtje patent pertains is the graduate engineer working in the general field and not the person educated or shop-trained to be a technician in the industry.

17. The Holtje power supply as claimed in the patent in suit was not anticipated in the prior art and the differences between the subject matter of the Holtje patent and the prior art are not such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter of the Holtje patent pertains:

A. The art knew and the electronics industry used regulated d.c. output power supplies that relied on both regulation of the firing angle of switching means in accordance with variations in the output voltage and such power supplies relying on a second-stage series pass

element for swift-response output voltage regulation with the series pass element acting to heat-dissipate the unregulated, d.c., voltage output of the rectifier stage; defendant offered both kinds of regulated d.c., output power supplies;

B. The Hoag concept, public since the February 1947 issue of Electronics, of using the voltage drop across the series pass regulator element to control input to the rectifier stage, and thus, indirectly, to the series pass regulator, did not present a commercially useful solution, and, while it marked a genuine theoretical advance, it was, in essentials, a visualization of the area in which an adequate solution could exist rather than being itself either a solution or a step toward the solution;

C. Hoag and other expedients centering on different modes of varying the power feed to the rectifier stage are indices of a continuing interest in and search for a solution that failed to arrive at Holtje's;

D. An unusual attack, like that of Woll, continued to adhere to the concept of using the variations in output voltage itself (by sample) to control the voltage regulation; Woll, however, moved in the direction of trying to isolate high frequency output variations for separate handling in a capacitance coupled shunt regulator (or variable impedance element) and led away from the Holtje solution;

E. Defendant, which manufactures upward of 300 types of power supplies, did not until after the first publication of data on the Holtje power supply in Electrical Design News of March 1959, and the commencement of plaintiff's marketing of its Type 1205B at that time, commence work on the designing of its KS series of power supplies (the allegedly infringing supplies); the first of defendant's KS were included in its catalog of January 1962; the KS design of supply was described by defendant in 1962 as controlling pass element dissipation by adjusting the firing angle on a pair of silicon controlled rectifiers in accordance

with the voltage across the pass section, the feedback system automatically acting to stabilize the power dissipation to a design minimum; the system was said, because it employed automatic control, to be programmable and the best control method for programmable high-power units; defendant introduced four KS models in 1962, listed 16 KS models in its 1963 and 1965 catalogs and in 1966 listed 20 KS models in an Instruction Manual page for its KS 18-10 (M) power supply; at the time of trial defendant was manufacturing 20 KS models.

F. Hewlett-Packard Co., one of the leading manufacturers of power supplies in the electronic field, has taken a license under the Holtje patent and uses the system in a number of its power supplies.

G. Other than the art referred to above, no evidence has been produced as showing that the system of Holtje in its central concept was known to or suggested by any one and it is a fair inference and it is found that the disclosure of Holtje's teaching was the first time any one heard of the central concept of the Holtje power supply.

H. The elements of the Holtje system were all familiar to persons skilled in the art, and they had long been at hand for anyone to organize into a power supply having the characteristics of Holtje's system.

I. Holtje united the familiar elements of his system under a novel and surprising mode of cooperation, that produced a new and advantageous result; the prior art in the main had treated *as alternative* or disjunctive approaches what Holtje brought into cooperative action, and he produced a superior result while effecting economies in parts used and in size.

J. Holtje's solution is characterized by electronic elegance (using the last word in the sense used in scientific and mathematical applications) and not simply by ingenuity.

18. Silicon controlled rectifiers, like thyratrons, are unidirectional and a switching means; when arranged as a bridge rectifier connected to a secondary winding, as in defendant's KS power supplies, they are the same in function, general method of operation and result as the thyratron pair when used as in Holtje's patent Fig. 1.

19. A transistor when used as a series pass element is the equivalent of a vacuum tube used as a series pass regulator tube, and, like the vacuum tube, dissipates power by evolving heat.

20. Before the filing of the complaint in the present action (September 1, 1965), and within six years before that date defendant manufactured, used and sold products in the United States which are correctly described on pages 24-25 of defendant's 1965 Catalog B-657 (Ex. 3, sub-exhibit 2) as defendant's KS series power supplies. (Stipulated.)

21. The circuit diagram on page 24 of Catalog B-657 is a simplified block diagram of the KS group of Defendant's power supplies (stipulated). Other simplified block diagrams from defendant's advertising or promotional literature or furnished by defendant are Exhibit 16, lower diagram; Exhibit 23, p. 69, Fig. 5.12; Exhibit 21, p. 11 (Catalog B-621); Exhibit 22, p. 24 (Catalog B-631); Exhibit G; and Exhibit 15-A, Fig. 4-5.

22. Exhibit 15-A, p. 4-9, Fig. 4-5 is a simplified but fuller diagram of the KS circuit, with particular reference to the "Pre-Regulator Circuit"; Exhibit G is a more detailed block diagram than those listed in finding 21 and shows the pre-regulator circuit in greater detail.

23. The circuit diagram on page 24 of defendant's catalog B-657 is not a complete schematic circuit of the KS 60-20 power supply; there are many inter-connection and feedback paths not shown in the circuit on page 24 of Catalog B-657. (Stipulated.)

24. The circuit diagrams in Ex. 3 sub-exhibits 3A through 3P (pages 20-21, Kupfarberg deposition, December 6, 1965) correctly represent the KS power supplies represented thereon and are more detailed drawings of the simplified diagram of page 24, Catalog B-657, and represent equipment manufactured, used and sold by defendant within the United States within six years of the date of the filing of the complaint. (Stipulated.)

25. All promotional or advertising material issued or published by either party was prepared for or by the party whose products it advertises, was approved by that party, and was duly published, all subject to correction should error appear. (Stipulated.)

26. The simplified block diagrams referred to in finding 21 are not incorrect in what they disclose.

27. In place of the thyratron rectifier tubes 11 and 13 in Figs. 1 and 2 of the Holtje patent other types of voltage switching or voltage-interrupting unidirectionalizing devices, including magnetic amplifiers, may be similarly employed (Holtje, Col. 2, 11. 21-24). (Stipulated.)

28. With respect to the power supply which is the subject matter of the Holtje patent in suit, the second feedback means, path, loop, including the source of potential, must provide an over-all response to DC. (Stipulated.)

29. The claims in suit, Claims 1 through 4, read on the KS power supply; using the general schematic diagram of defendant's KS series attached as Annex A (Ex. 3-2-A), it is numbered to correspond to the numerals used in Fig. 1 of the Holtje patent; in reading Claims 3 and 4 "regulator tube" is considered satisfied by the equivalent transistor 25.

A. Claim 2 may be read as follows:

A power supply having an alternating-current input 1 and a direct current output 27, 29, switching means connected to the input and operating synchronously with the alternating-current input [the diamond shaped full-wave

bridge rectifier which includes the silicon controlled rectifiers 11, 13 and is connected to the opposite ends of the secondary winding 5 of the a.c. input transformer 1, 3, 5], energy-storing means 21 for storing the energy from the switching means 11, 13, voltage regulator means 25 connected between the energy-storing means 21 and the output 27, first feedback means [connected at 45 to voltage divider 41, 43 across output 27, 29, reference voltage at 46, voltage amplifier at 47, and connection to voltage-regulator 25 by conductor 16 at 49] connected between the output 27, 29 and the voltage-regulator means 25 for controlling the same in accordance with variations in the voltage at the output 27, 29, and second feedback means including a source of potential [indicated by conductor 51, the box marked "Pre-Regulator Control" connected across the voltage-regulator 25 at points on conductors 35, 39, the conductor 10 connecting to the gates of the silicon controlled rectifiers 11, 13 at 53, 55; Fig. 4-5, page 4-9 of Exhibit 15A identifies the source of potential in the pre-regulator circuit at the place marked CR 308, a reference diode, and bracketed "V Ref 18 V" meaning reference voltage 18 volts] connected between the output 27 and the switching means 11, 13 to control the voltage obtained from the switching means 11, 13 in accordance with variations in the voltage across the voltage-regulator means 25, thereby to limit the range of voltage developed across the voltage-regulator means 25.

B. Claim 1 may be similarly read since it states no element not found in Claim 2 and states the common elements in the same relations.

C. Claim 4 may be read as follows:

A power supply having an alternating-current input 1 and a direct-current output 27, 29, voltage rectifying means connected to the input [the bridge rectifier including silicon controlled rectifiers 11, 13, connected across opposite ends of the secondary winding 5 of the a.c., input

transformer 1, 3, 5], energy-storing means 21 for storing the rectified voltage, a regulator tube 25 [a transistor equivalent of the vacuum tube 25 of Holtje; the transistor has three electrodes, an emitter 37, analogous to the cathode 37 in Holtje, a base electrode 49, analogous to the grid 49 in Holtje, and a collector 33, analogous to the plate or anode 33 in Holtje, and it performs the functions of a vacuum tube in a completely analogous manner] connected between the energy-storing means 21 and the output 27, first feedback means [as indicated in Claim 2 above] including an amplifier 47 connected between the output 27 and the regulator tube 25 [by equivalence as above] for controlling the same 25 in accordance with variations in the voltage at the output 27, 29, and second feedback means [connected across the regulator transistor 25 near points 35, 39 on the line 19 to 27 and by conductor 51 to the "Pre-Regulator Control" block and by conductor 10 thence to the control electrodes 53, 55 of the silicon controlled rectifiers 11, 13] including a source of potential [as indicated for Claim 2 above, at CR 308, VREF 18 V in Fig. 4-5, pp. 4-9 of Ex. 15-A] connected between the output 27 and the rectifying means [the bridge rectifier including silicon controlled rectifiers 11, 13 connected to the point 19 above capacitor 21] to control the voltage obtained from the rectifying means [the bridge rectifier] in accordance with variations in the voltage across the regulator tube 25 [by equivalence as above], thereby to limit the range of voltage developed across the regulator tube 25.

G. Claim 3 may be read on the KS supply in the same way, since it contains no elements not contained in Claim 4, and its elements are related to one another in the same way.

H. In operation the KS supply functions in a manner that is within the central concept of the Holtje patent, finding 9 above.

30. In operation the KS power supply demonstrably operates to limit the range of voltage developed across the regulator means or tube (a transistor in the KS

supply), doing so in virtue of the "Pre-Regulator Control" feedback path to the control electrodes of the silicon controlled rectifiers, which controls the voltage obtained from the rectifying or switching means (*i.e.*, the bridge rectifier including the silicon controlled rectifiers) in accordance with the voltage across the voltage-regulator means or "tube" (in the KS supply an equivalent transistor). The control is effected electronically by controlling the firing angle (time) of the silicon controlled rectifiers of the KS supply as a function of the difference between the voltage drop across the regulator element and a pass reference (Exs. 16, 23, pp. 68-70) as taught by Holtje.

31. The KS power supply feedback to the bridge rectifier control electrodes provides an overall response to DC notwithstanding that the voltage across the pass element (Vx in KS terminology) is offset by a reference voltage (VREF 18 V at CR 308 in the KS 18-10 (M) power supply, Ex. 15A, Vy on Ex. G), summed and amplified with other voltages (see Ex. G), and communicated along an a.c., path; the voltage across the pass element is summed with (a) d.c., signal from and proportional to the a.c., input, (b) a.c., signal from the same source, and (c) virtual signal proportional to output or load current; the sum of the other voltages cannot exceed the difference between the voltage across the pass element and the reference voltage (times a constant always less than 1, and typically 0.05, see Ex. G), and the algebraic summation of the values cannot go to zero or reverse the effect of the voltage across the pass element; without the series-pass-element voltage-component it would be impossible to limit the dissipation across the series pass element, and in such case the complete output voltage would appear across that element when the output voltage was varied from full voltage down to zero (see Ex. 18); *e.g.*, if the Vx of the feedback loop in the KS-60 power supply were not applied, as the output voltage was turned down from 60 volts to zero, the voltage across the pass element (varying inversely) would compensatingly increase by 60 volts, all such increase constituting dissipation.

32. The a.c., feed-back path of the KS power supply, used in the pulse-scheme of firing-time control (see Ex. 15A, p. 4-10, Fig. 4-6), does not obliterate but conveys the d.c., voltage information derived across the series pass element to the control electrodes of the silicon controlled rectifiers in the bridge rectifier, and they respond to the d.c., information in firing time so that the range of the voltage variation across the series pass element, the dissipation, is kept in the design range.

33. The Holtje power supply involves the use in the feedback path to the grids of the rectifying thyratrons of antiphase alternating-current substantially ninety degrees phase-shifted with respect to the input a.c., voltage in means for biasing the grids or control electrodes of the thyratrons (Holtje, Col. 3, ll. 6-14, Col. 2, ll. 33-45, Col. 5, ll. 30-35, Ex. 11-A, p. 2; Ex. 12, p. 11); the source of potential 57 is an offsetting voltage approximating the design voltage across the series pass element 25.

34. The Claims of Holtje are not; by reason of the history of the prosecution of the patent, or of the language of the specification restricted to an unamplified feedback to the control electrodes of the rectifier means, or to a feedback of d.c., conducted through directly connected and uninterrupted conductors as distinguished from a path along which a.c., passes across capacitors.

A. In the language of his specification the inventor states that the cathodes of the thyratrons are "connected together at 19 and through a voltage storing capacitor or capacitors 21 to the ground terminal 23";

B. The applicant did not distinguish Hoag, nor did the patent office allow Holtje any claims over Hoag, on the ground that Hoag involved an a.c., feedback path; only the office action of February 2, 1959, discussed Hoag, and did so in terms unrelated to any a.c., path as against d.c., path differentiation; it is not evident from Hoag that his feed-

back path 24 and voltage controller 10 (and Fig. 3) involve an a.c., feedback path in any sense relevant to the uses of a.c., in the Holtje and KS feedback path circuits; the Hoag feedback, rather, seems to control an a.c., autotransformer through d.c., information operating through the servo mechanical linkages of Fig 3;

C. The applicant did not in his response of September 17, 1958, differentiate Haller, No. 2,095,742, and Power, No. 2,113,220, on the ground that they did *not* provide a "direct" feedback path and that they *did* provide amplification of the feedback signal; Haller was distinguished on the basic ground that his *rectifying* tubes were controlled in accordance with a sensing voltage fed back from the *load* circuit through an amplifier "to compensate for variations at the *load*" (italics added); Power was similarly differentiated as controlling the *rectifier* tubes in accordance with the concept of taking part of the *load* variations and applying it to the control electrodes of the *rectifier* tubes; the contrast presented was Holtje's use of his corresponding amplifier 47 to apply *load* variations to control the voltage regulator tube 25, a tube not present in Haller and Power, while using a *further* feedback path 51, 18 "directly from the load", and not including any amplifier, but a potential source 57, to control the electrodes of the switching rectifier tubes "to maintain the voltage *across* the voltage regulator tube 25 (absent in the Haller and Power systems) at substantially the voltage of the source 57"; (italics supplied); the applicant summarized his distinction by stating that the only feedback circuit in the references was from the *load* through the amplifiers to the *switching tubes,* which did *not* control (as Holtje did) the switching tubes "in accordance with variations in the voltage across the *voltage regulator* means, as claimed."

35. The defendant's KS power supplies as evidenced in Exhibit 3 sub-exhibits 3A through 3P infringe Claims 1, 2, 3 and 4 of the Holtje patent.

CONCLUSIONS OF LAW AND ORDER FOR JUDGMENT

A. Claims 1, 2, 3 and 4 of Holtje U. S. Patent No. 2,942,172 are valid.

B. Defendant's KS power supplies as evidenced in Exhibit 3, sub-exhibits 3A through 3P infringe Claims 1, 2, 3 and 4 of the Holtje U. S. Patent 2,942,172.

C. Plaintiff is entitled to recover of the defendant damages as provided in 35 U.S.C. § 284 for past infringement and to an injunction against further infringement.

It is accordingly

ORDERED that

1. Defendant file and serve an account of its sales of KS power supplies showing sales of each model by quarters and stating for each model the total number sold in the quarter and the total money realization on such sales commencing with the date on which plaintiff first complied with 35 U.S.C. § 287; such account to be filed on a date agreed between the parties, or in the absence of agreement, two months after the filing of the present order;

2. The Clerk enter judgment, in form to be approved by the Court, (a) that Claims 1, 2, 3 and 4 of Holtje U. S. Patent No. 2,942,172 are valid and have been infringed and are being infringed by defendant's making, using and vending its KS Group power suplies; (b) that defendant is enjoined from infringing Claims 1, 2, 3 and 4 of Holtje U. S. Patent No. 2,942,172 or any of them by making or using or vending its KS Group Power Supplies and from infringing said claims in any other manner; (a) that defendant account for the damages for the past infringement of Claims 1, 2, 3 and 4 of Holtje U. S. Patent No. 2,942,172; and (d) that jurisdiction is retained for the purpose of determining and assessing damages for past infringement.

Brooklyn, New York
September 22, 1969.

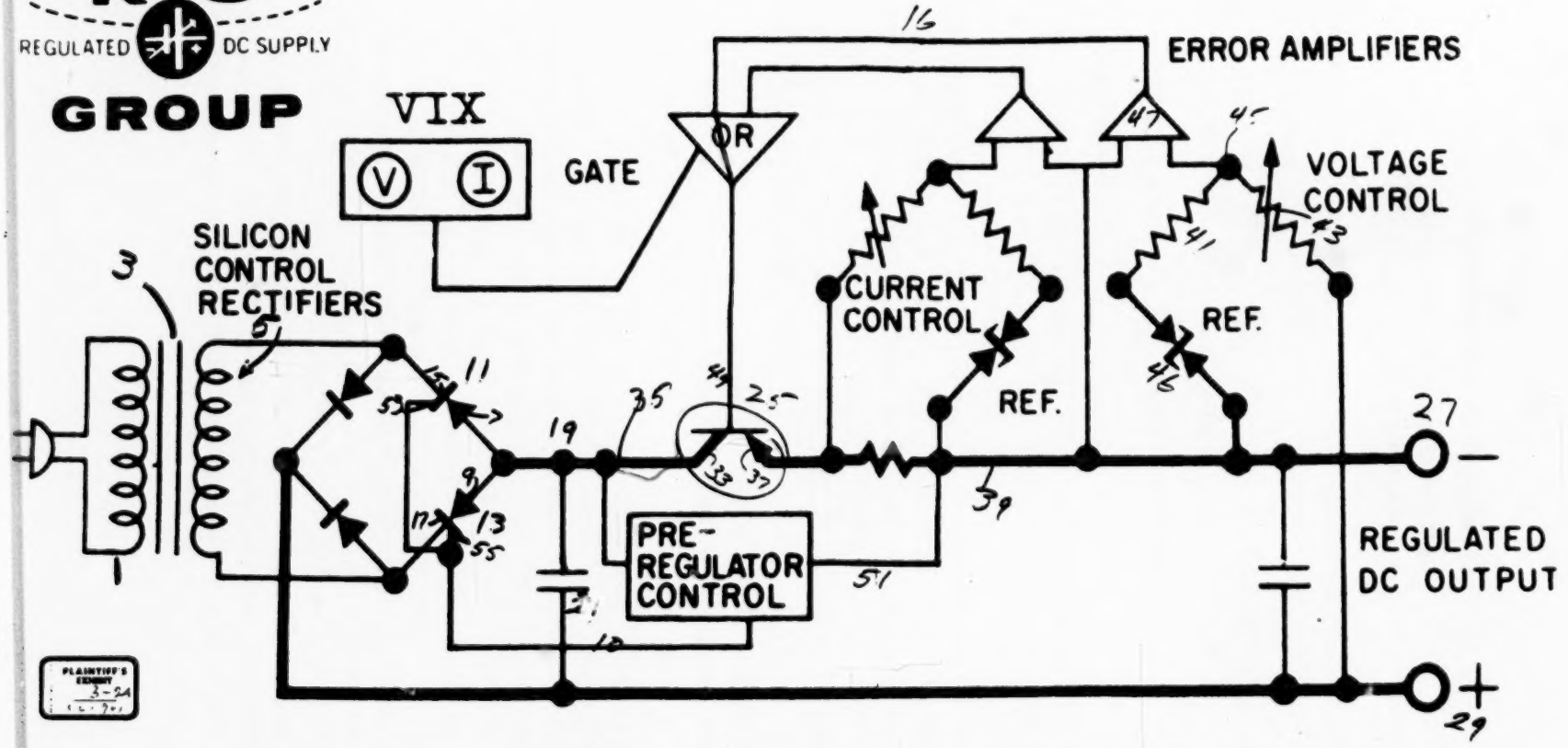
JOHN F. DOOLING, JR.
*U. S. D. J.*

PLAINTIFF'S EXHIBIT 3-2A.

(See Opposite Page.)

kepco

K S REGULATED DC SUPPLY GROUP




All models are designed for continuous operation without derating under all specified line, load and temperature conditions.

## Memorandum by Dooling, J.

UNITED STATES DISTRICT COURT,
EASTERN DISTRICT OF NEW YORK.

SAME TITLE

Appearances:

ROBERT H. RINES, Esq. (JULIUS E. FOSTER, Esq. and Messrs. RINES & RINES, of Counsel), for plaintiff.

JOSEPH R. MCPHEE, JR., Esq. for defendant.

DOOLING, D. J.:

In this well-tried case, in which plaintiff sued for the alleged infringement of Holtje United States Patent No. 2,942,172, it has been concluded that the four claims of the patent allegedly infringed are valid claims and that defendant has infringed them. The case essentially involves issues of fact, and the facts have been separately found. Only a question arising on the file history of the case and the issue of unobviousness under 35 U.S.C. § 103 require separate discussion.

Holtje's patent relates to an electronic power supply system for converting alternating current energy into regulated direct current energy.

Power supplies of the class involved are designed for electronic applications in industry and laboratory which require fine control of the output of direct current in terms both of stability and of flexibility. Two familiar types of supplies were, *first,* supplies in which a running "sample" of the voltage at output was continuously fed back to the control elements of the rectifier that converted the input alternating current into "unregulated" direct current so as to control the voltage obtained from the rectifier in accordance with the variations of the voltage at the output; and, *second,* supplies in which the unregulated voltage obtained from the rectifier was not varied, but a regulator tube or transistor was added between the rectifier and the

output, and a running sample of the voltage at the output was so fed back continuously to the control element of the regulator tube or transistor that its resistance or impedance —the "voltage drop" across it—varied inversely with the variations of voltage at the output. Both types of power supply embodied much circuit detail, and they employed numerous circuit elements, but both sought to fill the same need in ways that had tended to be treated as natural alternatives, as presenting a choice between—on the one hand—limiting the voltage obtained from the rectifier in accordance with the load requirement at output (a "low dissipation" but relatively slow-response technique) and—on the other hand—keeping the unregulated voltage obtained from the rectifier relatively constant and "dissipating" the unrequired voltage in the regulator tube or transistor as heat (a swift-responding but high-dissipation technique).

Each of the modes had its disadvantages. Control by feedback from output to rectifier was—in electronic terms—slow responding; the response time could be (in the case of 60 cycle input alternating current) 1/120 to 1/60 of a second. In such supplies "spikes" and "transients" were characteristic; they had to be filtered out with large-scale capacitor networks, and the output impedance was high. Control through the regulator-tube or transistor was fast responding—response time could be in the order of millionths of a second—but the requirement of heat dissipation of power in the regulator tube or transistor imported either a sharp limitation on the permissible range of output voltage variation or the use of large regulator elements, to manage the inverse but equally wide range of dissipation.

Hoag, whose patent presented the principal prior art point, had in his patent No. 2,511,850 of 1950 taught—as a means of minimizing dissipation in the second type of power supply—controlling the amplitude of the input of alternating current to the rectifier in response to the voltage drop across the regulator-tube. Hoag proposed to do this by rigging a "voltage controller" between the power

line and the power supply as it previously existed. The "voltage controller" was made up of an autotransformer, the alternating current output of which was variable by the movement along the transformer winding of a mechanically operable control, a motor to move the control of the autotransformer back and forth across the winding, two relay circuits to control the forward and reverse field windings of the motor, and electronic circuitry arranged to pick up and utilize signals to determine the direction and magnitude of the motor turn and, hence, of the movement of the autotransformer output control. In Hoag the signal that actuated the voltage controller was derived from the voltage drop across the regulator-tube. Hoag's feedback varied the amplitude (not the phase-angle) of the alternating-current input to the rectifier in response to the variations in the voltage drop across the rectifier. The "voltage controller" of Hoag was, in a sense, a servo-mechanical subassembly, an external adjunct to the second type of power supply.

Hoag's was not a commercially useful power supply; the elaborate mechanism and additional components it required implied both bulk and cost; its response time in the rectifier stage would be comparatively slow, evidently slower even than rectifier control directly from output. But Hoag did preserve the virtues of the second type of power supply, the fine and fast acting regulator-tube function, and he did suggest the use of the voltage drop across that tube as a source of control data for somehow bringing the rectifier's production of unregulated direct current into line, from moment to moment, with the voltage at output. Hoag did not, however, teach a useful means of doing that.

Holtje in his patent in suit teaches use of a signal continuously derived from the variations in the voltage drop across the regulator tube to control the firing-time or angle (or phase) of the rectifier tube; like Hoag he preserves intact the fine control and swift response of the regulator-tube stage, and like Hoag he uses as his feedback control

data the variations in voltage drop across the regulator tube; but Holtje uses the voltage drop data, not to control the operation of an adjunctive pre-rectifier stage added to the system solely to control the power feed to the rectifier, as Hoag did, but, in the incomparably better way of the familiar power supply of the first type mentioned above, directly to control the voltage obtained from the rectifier by varying the firing-time of the rectifiers in response to the feedback voltage variation data. Holtje's system joined the methods of two systems that had seemed alternative, and he brought about a result that lost no advantage of either, eliminated their separate disadvantages, and achieved more than the sum of the separate advantages claimed for each. The spikes and transients, the high output impedance and the elaborated capacitance provision of the first type of system were eliminated; the need for large regulator tubes and great dissipation capacity, and the limited range and narrowed efficiency bands of the second type of system were eliminated; Holtje's system achieved a range of voltage variation free of spikes and transients beyond the other systems, and it did so with a physically compact system that required no components blown up in scale to compensate for the inherent limitation of the earlier systems.

1. From the outset of the prosecution of the patent the applicant insisted that his patentability lay in his united use of rectifier tubes and a regulator tube, and in the use of a feedback (a *second* feedback, additional to that from output to the regulator-tube) from output to control the rectifier tubes ("switching rectifiers") themselves in accordance with the variations in the voltage drop across the voltage-regulator tube. He thus differentiated the first art cited against him, evidently patents dealing with one or another variant of power supplies of the second type mentioned above. He dealt in exactly the same way with the second group of patents cited in the next letter of the Examiner, evidently disclosing one or another variant of power sup-

plies of the first type mentioned above. All claims were rejected in both the Examiner's letters, and the applicant made no amendments of any sort, in specification or claims to meet the rejections. (The only amendments were to correct a plain error in Fig. 1 and to add labeling in both figures.) Holtje insisted throughout on his claimed patentable subject matter, presented and argued for just as it was in the specification.

In his third letter the Examiner cited Hoag for the first time, and, primarily on Hoag, rejected twelve claims and allowed nine. (Four other claims on method of regulation were rejected on a presently irrelevant ground.) Stating that the allowed claims "adequately cover the invention," the applicant canceled the rejected claims, asserting that his cancellation was not a disclaimer; the applicant insisted that Hoag, and the patents cited along with Hoag, were no more pertinent than those already cited and disposed of. The patent then issued with the present claims.

Defendant argues that a comparison of the rejected and canceled claims with the allowed claims must, in effect, result in limiting plaintiff to claiming as patentably new only that which is in the rejected claim—that, as it were, plaintiff's own rejected claims operate like prior art over which his allowed claims must show patentability. The point is made by a parallel reading of application claims 4 and 5, the first of which was rejected and the second allowed as Claim 1 of the patent:

> "4. A power supply having an alternating-current input and a [direct-current] output, switching means connected to the input and operating synchronously with the alternating-current input, voltage-regulator means connected between the switching means and the output, and feedback means [including a source of potential] connected between the output and the switching means to control the voltage obtained from the switching means in accordance with variations in the

voltage across the voltage-regulator means, thereby to limit the range of voltage developed across the voltage-regulator means.

"5. A power supply having an alternating-current input and an output, switching means connected to the input and operating synchronously with the alternating-current input, *energy-storing means for storing the energy from the switching means,* voltage-regulator means connected between the energy storing means and the output, and feedback means connected between the output and the switching means to control the voltage obtained from the switching means in accordance with variations in the voltage across the voltage-regulator means, thereby to limit the range of voltage developed across the voltage-regulator means."

Matter in square brackets in claim 4 was not in claim 5, and the matter underlined in claim 5 was not in claim 4; in claim 5 the voltage-regulator means is stated to be connected "between the energy storing means and the output" rather than "between the switching means and the output," since no "energy storing means" were recited in application claim 4. The Examiner did not state the ground on which he allowed the nine claims nor how he found them different from the rejected claims. The language in which the Examiner rejected claims on Hoag adds to the confusion, for it might if read in one sense seem almost to support rejection of all claims, and it points to no immediately perceptible difference between such claims as 4 and 5. That aspect of the matter is purely factual, and it is covered in the findings.

If the standard of interpretation for which defendant argues were valid and applied to the file history of the Holtje patent, there would be no way of locating a definable and patentable structure in the allowed claims of the patent. The patent claims would become barren of meaning. The "energy-storing means" (present in all allowed claims and

absent from all rejected claims) seems to be an essential and is certainly a conventional element in all rectifier stages of the kinds involved, and its introduction is attended by no novelty at all. The "source of potential," in claim 4 and not in claim 5, is present in allowed claims (*e.g.*, claim 2 of the patent), and, while very much a part of the system, it performs a well known office. The question then is, what is the applicable standard for reading the allowed claims of Holtje in the light of the rejected claims.

The broad statement of the principle or rule of interpretation in *Schriber-Schroth Co.* v. *Cleveland Trust Co.*, 1941, 311 U.S. 211, 220-221, is that an allowed claim must be interpreted with reference to claims that have been cancelled or rejected and cannot be read to cover what was so eliminated from the patent, and that, while the rule is usually invoked where the cancelled claim is the broader one, the reason of the rule and the rule apply if the cancelled or rejected claim is the narrower one. The rule was applied in *Schriber-Schroth* to reverse the action of a lower court which had read into a claim an element which the lower Court considered indispensable to patentability to sustain its validity the element was not without support in the original specification, but it was not claimed originally and it had been introduced into the claim language by an amendment of claims that were then thrown into a three-party interference and rejected. The Court had no difficulty in holding that it was error to read into the claim a critical element that was not expressed in it and the implication of which was inhibited by the file history. *Graham* v. *John Deere Co.*, 1966, 383 U.S. 1, 33-34, conversely, applied the rule—allowed claims must be interpreted with reference to rejected ones and to the prior art, and claims narrowed to obtain issuance of the patent by distinguishing prior art cannot be read to cover that which has previously been eliminated from the patent by limitation—to a patentee who, on the file history, had given up his broad claims and submitted new claims for a spray cap that relied for pat-

entable difference on the rib-sealing feature of his cap; the Court held that, since that element was not unobvious in the light of a prior art patent, the patentee could not prevail on validity. Similarly, *Taylor-Reed Corp.* v. *Mennen Food Products, Inc.*, 7th Cir. 1963, 324 F.2d 108, *Mestini* v. *American Telephone & Telegraph Co.*, 2d Cir. 1966, 369 F.2d 378, and *General Instrument Corp.* v. *Hughes Aircraft Co.*, 1st Cir. 1968, 399 F.2d 373, 385-386, apply the rule where a limitation was introduced into a claim in order to gain allowance and the patentee later sought to enforce the claim broadly.

The applications of the rule illuminate the principle of the rule and its irrelevance to the present case. Here, the claims allowed are original, wholly unamended claims, and they were allowed in the same communication in which the other claims were rejected on a specific prior art patent, Hoag. The Examiner's path of reasoning may be initially difficult to follow, but the dispositively significant fact is that he allowed claim 5 and the other claims over Hoag at the same time that he rejected claim 4 and other claims on Hoag. So long, then, as the patentee does not attempt to extend the boundary of any allowed claim so as to take in what is embraced only by the broader domain or different thrust of a rejected claim, the patentee is within his grant. He cannot be denied his original, narrow, and unamended claim in its own fair reading on the bare ground that his broader claims, drawn to the same patentable subject matter, were rejected in the same office action. *Cf. Williams Bit & Tool Co.* v. *Christensen Diamond Products Co.*, 5th Cir. 1968, 399 F.2d 628, 634-635.

The Examiner's rejection of claims like claim 4 "as finding their full equivalent in Hoag" can rest only on the Examiner's belief that the rejected claims were so broadly phrased that they could be read on Hoag, and that the allowed claims could not be so read; rightly or wrongly, that is, he read "voltage-regulator means connected between the switching means and the output * * * and feedback means

* * * connected between the output and the switching means" as allowing room enough to incorporate in, or as, the feedback means any device that could *result* in controlling the unregulated direct-current obtained from the rectifier stage; that could include Hoag's pre-rectifier subassembly or anything else that was hooked in either ahead of or integrally to the rectifier. He allowed the claims that he found faithful to the teaching of the specification and the applicant's explication of what he claimed was patentably new, that is, the claims limited to feedback of the variations in voltage drop across the voltage-regulator tube so as to effect control by operating integrally to the rectification process itself—by using the voltage-variation date to advance and retard the firing-time of the rectifier tubes. The Examiner did not explain why he thought that inclusion of the "energy storing means" in the claim language accomplished the objective, but the findings indicate that there was basis in fact for his implicit judgment on the point. *Cf. Eimco Corp.* v. *Peterson Filters and Engineering Co.*, 10th Cir. 1968, 406 F.2d 431, 438.

The Examiner's statement (from this overall viewpoint) that, in the rejected claims, control of the firing-time of the rectifier tubes and addition of the voltage controller stage would be equivalents, and substitution of the control of firing-time for Hoag's voltage controller stage would therefore be non-inventive, is true in context, but it is not a denial of the presence of the patentable subject matter that Holtje was trying to capture by his claim language. Firing-time control of rectifiers as such is old. Hoag claimed no novelty within his voltage-controller as such. If both were indifferently usable within the proposed claim language under discussion, they necessarily dwindled to equivalents, and it became evident that the claim language, as read by the Examiner, had failed to capture Holtje's patentable subject matter differentially. His patentable subject matter lay not in any supposed novelty in using feedback to control rectifier tube firing-time but in the new

and useful organization that he brought to the known devices and techniques. And, of course, that one thing is the equivalent of another in mode of operation and in result does not, in any event, mean necessarily that a device or method may not be patentably inventive over an equivalent of it. It was the very fact that the transistor was the exact equivalent of the vacuum tube over so wide a range of vacuum tube roles that formed a large part of the usefulness of the transistor viewed as a "new and useful" and no doubt patentable device.

2. The evidence that the Holtje power supply was patentably new and useful includes both objective indications and intrinsic considerations and warrants the conclusion reached in the finding of fact that Holtje's claims 1 through 4 are patentable by the standard of 35 U.S.C. § 103.

The system of the power supply is a deft and imaginative union of elements that was not suggested by or inherent in their nature and previous uses. If anything, the art had seen divergent paths where Holtje visualized—convergence of function. Where Hoag was ingenious but plethoric of parts and adjuncts, Holtje brought the simplifying insight that grasped the economy of electronic means that could be bent to Hoag's goal and reach it securely in one stride and with better result.

Need for the Holtje advance is difficult to quantify in the field involved, but the disadvantages that Holtje overcame were long familiar ones, and others had sought without practical success to meet them or limit them with one or another device or expedient. All agree that the elements that Holtje brought into fruitful union had long been in the art for others to synthesize as Holtje did. Only he searched out the new approach. Defendant's catalogues indicate something of the impressive range of its expertise in and concern with the power supply field, and its use of some of the earlier expedients for overcoming the defects of the two types of power supplies with which the art was

familiar indicates that defendant fully understood the limitations of the power supplies it was making. The Holtje system was adopted into defendant's line as a group of new supplies, first in four and ultimately in twenty models. There is no suggestion that Holtje's approach was known to or tried by defendant until after Holtje's device was publicly disclosed and described. One of the leading manufacturers, if not the leading manufacturer of power supplies took a license and embodied the system in a number of power supply models and uses. Defendant said of this type of its power supplies, "It is one of the most versatile high power supplies made."

Such considerations do not equate with a demonstration that there is patentability under Section 103 but they fortify the conclusion objectively.

Brooklyn, New York
September 22, 1969.

JOHN F. DOOLING, JR.
U.S.D.J.

---

UNITED STATES DISTRICT COURT,
EASTERN DISTRICT OF NEW YORK.

Same Title

A memorandum dated September 22, 1969 and findings of fact, conclusions of law and order for judgment dated September 22, 1969 of the Hon. John F. Dooling, Jr. having been filed directing the Clerk to enter judgment as set forth therein in form to be approved by the court, it is

ORDERED and ADJUDGED that

A. Claims 1, 2, 3, and 4 of Holtje U.S. Patent No. 2,942,172 are valid and have been infringed and are being infringed by defendants making, using and vending its KS Group power supplies.

B. Defendant is enjoined from infringing claims 1, 2, 3, and 4 of Holtje U.S. Patent No. 2,942,172 or any of them by making or using or vending its KS Group Power Supplies and from infringing said claims in any other manner.

C. That defendant account for the damages for the past infringement of claims 1, 2, 3, and 4 of Holtje U.S. Patent No. 2,942,172, and

D. That jurisdiction is retained for the purpose of determining and assessing damages for past infringement.

Dated: Brooklyn, New York
November 24, 1969

LEWIS ORGEL
*Clerk*

Approved:
s/ JOHN F. DOOLING, JR.
U.S.D.J.

---

## APPENDIX C

### Amendment 5, U.S. Constitution

No person shall be . . . deprived of life, liberty, or property, without due process of law . . .

### 35 U.S.C. 281

**Remedy for infringement of patent**

A patentee shall have remedy by civil action for infringement of his patent.

### 35 U.S.C. 103

**Conditions for patentability; non-obvious subject matter**

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject mat-

ter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Rule 52(a) of the Federal Rules of Civil Procedure

Findings by the Court

(a) Effect. In all actions tried upon the facts without a jury or with an advisory jury, the court shall find the facts specially and state separately its conclusions of law thereon, and judgment shall be entered pursuant to Rule 58; . . . Findings of fact shall not be set aside unless clearly erroneous, and due regard shall be given to the opportunity of the trial court to judge of the credibility of the witnesses. . . .